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1. (canceled)

1 ~~2~~. (currently amended) A noise canceling method comprising the steps of:

periodically inserting a zero-point into a transmission signal,

establishing synchronization based on a received signal,

extracting the zero-point based on the established synchronization and interpolating a

noise component of the received signal by using the zero-point, and

subtracting the noise component from the received signal,

wherein the step of interpolating includes steps of performing a frequency shift of the received signal to a desired frequency bandwidth, decimating according to the zero-point, performing an interpolation, and finally performing the frequency shift in a reverse direction so as to adjust to an original signal, thereby generating the noise component of the received signal.

2 ~~3~~. (previously presented) The noise canceling method as claimed in claim ~~2~~¹, wherein one or more zero-points are inserted at intervals of an integer number of samples.

3 ~~4~~. (previously presented) The noise canceling method as claimed in claim ~~3~~², wherein an inserted number of the zero-points is determined by deciding a signal quality on ^athe reception side to be notified to ^athe transmission side.

4 ~~5~~. (previously presented) The noise canceling method as claimed in any one of claims ~~4~~¹ to 4 wherein a transmission line of the received signal includes a transparent transmission line.

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5 ~~8~~. (previously presented) The noise canceling method as claimed in claim ~~8~~¹, wherein the transparent transmission line includes a Nyquist transmission line.

7. (canceled)

6 ~~8~~. (currently amended) The noise canceling method as claimed in claim ~~[[7]]~~¹, wherein for the step of interpolating, the zero-point is inserted into the decimated signal, and a low-pass filter process for making an interpolation bandwidth a transmission bandwidth is further performed.

7 ~~8~~. (previously presented) The noise canceling method as claimed in claim ~~8~~⁶, wherein the low-pass filter process includes a cos-squared filter process for making the interpolation bandwidth a Nyquist bandwidth.

8 ~~10~~. (previously presented) The noise canceling method as claimed in claim ~~8~~⁶, wherein the low-pass filter process includes a cos filter process for making the interpolation bandwidth a Nyquist bandwidth.

9 ~~11~~. (currently amended) The noise canceling method as claimed in claim ~~[[7]]~~¹, wherein a frequency bandwidth, in which a noise frequency component is large, is detected in

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the received signal so that the amount of the frequency shift is automatically determined for the desired frequency bandwidth.

10 ~~12~~. (previously presented) The noise canceling method as claimed in any one of claims ~~2~~¹ to ~~3~~³ wherein an automatic equalizing process is further performed so as to remove an intersymbol interference at a former or latter stage of a noise cancellation.

13. (canceled)

11 ~~14~~. (currently amended) A noise canceling apparatus comprising:
means periodically inserting a zero-point into a transmission signal,
means establishing synchronization based on a received signal,
means extracting the zero-point based on the established synchronization and
interpolating a noise component of the received signal by using the zero-point, and
means subtracting the noise component from the received signal,
wherein the means for interpolating include means for performing a frequency shift to the received signal to a desired frequency bandwidth, means for decimating according to the zero-point thereafter, means for further performing an interpolation, and means for performing the frequency shift in a reverse direction so as to adjust to an original signal, thereby generating the noise component of the received signal.

12 ~~15~~. (previously presented) The noise canceling apparatus as claimed in claim ~~14~~¹¹, wherein one or more zero-points are inserted at intervals of an integer number of samples.

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¹³ ~~16~~. (previously presented) The noise canceling apparatus as claimed in claim ~~15~~¹², wherein an inserted number of the zero-points is determined by deciding a signal quality on ~~the~~^a reception side to be notified to ~~the~~^a transmission side.

¹⁴ ~~17~~. (previously presented) The noise canceling apparatus as claimed in any one of claims ¹¹ ~~14~~ to ¹³ ~~16~~ wherein a transmission line of the received signal includes a transparent transmission line.

¹⁵ ~~18~~. (previously presented) The noise canceling apparatus as claimed in claim ~~17~~¹⁴, wherein the transparent transmission line includes a Nyquist transmission line.

19. (canceled)

¹⁶ ~~20~~. (currently amended) The noise canceling apparatus as claimed in claim ¹¹ ~~[[19]] 14~~, wherein the interpolation means include a circuit for inserting ^{the point} zero-points into the decimated signal, and further include a low-pass filter for making an interpolation bandwidth a transmission bandwidth.

¹⁷ ~~21~~. (previously presented) The noise canceling apparatus as claimed in claim ~~20~~¹⁶, wherein the low-pass filter includes a cos-squared filter for making the interpolation bandwidth a Nyquist bandwidth.

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¹⁸ ~~22~~. (previously presented) The noise canceling apparatus as claimed in claim ¹⁶ ~~20~~, wherein the low-pass filter includes a cos filter for making the interpolation bandwidth a Nyquist bandwidth.

¹⁹ ~~23~~. (currently amended) The noise canceling apparatus as claimed in claim ¹¹ ~~[[19]] 14~~, wherein the means for performing the frequency shift include means for detecting a frequency bandwidth, in which a noise frequency component is large, in the received signal so that the amount of the frequency shift is automatically determined for the desired frequency bandwidth.

²⁰ ~~24~~. (previously presented) The noise canceling apparatus as claimed in any one of claims ¹¹ ~~14~~ to ¹³ ~~16~~ wherein an automatic equalizer is further provided for removing an intersymbol interference at a former or latter stage of a noise cancellation.

25. (canceled)

²¹ ~~26~~. (currently amended) A noise canceling method comprising the steps of:
receiving a signal periodically including a zero-point,
establishing synchronization based on a received signal,
extracting the zero-point based on the established synchronization,
interpolating a noise component of the received signal by using the zero-point, and
subtracting the noise component from the received signal,

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wherein the step of interpolating includes steps of performing a frequency shift of the received signal to a desired frequency bandwidth, decimating according to the zero-point, performing an interpolation, and finally performing the frequency shift in a reverse direction so as to adjust to an original signal, thereby generating the noise component of the received signal.

22 27. (currently amended) A noise canceling apparatus comprising:

means receiving a signal periodically including a zero-point,
means establishing synchronization based on a received signal,
means extracting the zero-point based on the established synchronization,
means interpolating a noise component of the received signal by using the zero-point, and
means subtracting the noise component from the received signal,

wherein the means for interpolating include means for performing a frequency shift to the received signal to a desired frequency bandwidth, means for decimating according to the zero-point thereafter, means for further performing an interpolation, and means for performing the frequency shift in a reverse direction so as to adjust to an original signal, thereby generating the noise component of the received signal.

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